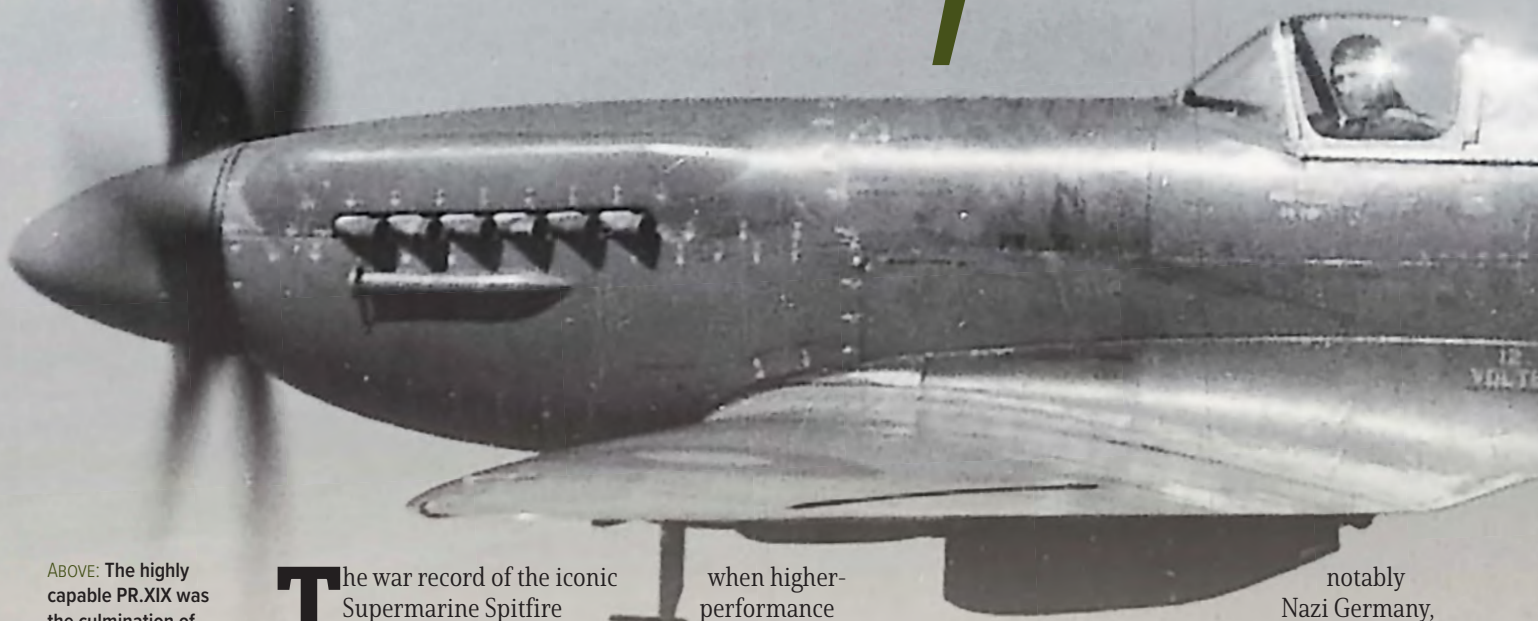


High-Speed

Spies



ABOVE: The highly capable PR.XIX was the culmination of all the experience and knowledge gained in recce operations during the war. This example, PM655/6C-W, flew with the RAF Photographic Reconnaissance Development Unit
ALL KEY COLLECTION UNLESS STATED

The war record of the iconic Supermarine Spitfire and its many successes in combat need no introduction. But fewer people know that this famous aircraft was also employed virtually throughout World War Two as a very useful reconnaissance platform. During the war, the whole science of photographic intelligence-gathering was developed and became highly specialised, and with it came many improvements in the aircraft delegated to this task and the types of equipment used.

Great importance

From almost the start of the war, the Spitfire played a vitally important role in the RAF's recce activities. Its employment in the conflict can basically be broken down into three distinct phases.

The first was early war usage, involving conversions of existing fighters. This was somewhat ad hoc before lessons were learned and operating techniques and equipment were developed to meet the needs of photo intelligence at that time. The second phase was a little later in the conflict,

when higher-performance Spitfires were available for conversion and several specific marks were produced solely for recce operations. Third, during the late war period a highly specialised and powerful mark of Spitfire was developed particularly for recce flying, and with which the RAF saw out the conflict and continued into the post-war period.

Immediate need

At the commencement of World War Two in September 1939, the RAF did not possess a dedicated or specialised recce or photo-intelligence organisation. These tasks were expected to be performed by such types as Bristol Blenheims and even Westland Lysanders. Clearly they were no match for Luftwaffe fighters or other defences, especially if flown alone without strong fighter cover. They also did not have the range to fly deep into enemy territory.

Pioneering work into more successful clandestine photographic operations had been carried out by several countries,

notably Nazi Germany, but Britain lagged in these developments. However, groundbreaking strides by several individuals were to transform this situation. Chief among them was a civilian named Sidney Cotton and a farsighted RAF officer, Fg Off (later Flt Lt) Maurice Longbottom.

An Australian by birth, Cotton was an eccentric but highly successful individual who specialised in several fields, notably aerial photography. Pre-war, he used a specially converted, camera-carrying twin-engine Lockheed 12A, civil registered G-AFTL, to clandestinely over-fly military installations – notably in Germany – using all manner of cover stories to mask his true intentions. He trialled many different innovations, one particularly useful development being the use of heat from the aircraft's engines to warm his onboard cameras, to avoid icing and prevent fogging of the lenses.

Maurice Longbottom was highly important in identifying the Spitfire as the ideal camera-carrying recce aircraft. He

At low level or higher altitudes, reconnaissance Supermarine Spitfires were vital to Britain's war effort. **Malcolm V Lowe** examines this oft-forgotten aspect of the type's illustrious career



correctly recognised that a small high-performance and unarmed long-range camera-carrying fighter would stand a much better chance of survival, and of taking useful photographs, than a lumbering bomber or short-range type. He submitted an influential memorandum during August 1939 entitled *Photographic Reconnaissance of Enemy Territory in War* to that effect, and many of his at-the-time somewhat contentious arguments turned out to be completely correct.

These two personalities and a small but dedicated team tried to convince the RAF that the Spitfire was the best aircraft for the job, and that a properly organised reconnaissance infrastructure was vital to make the best use of the aircraft and the way in which it was operated.

Well-conceived though their arguments were, it was still a difficult task to get the whole plan into effect. But experiences during the early weeks of World War Two convinced the powers-that-be that a proper reconnaissance organisation with effective aerial assets was vital and, little by little, the Spitfire became the focus of the argument.



LEFT: Two long-focus F.52 cameras are inserted into the fuselage of 2 Squadron Spitfire PR.XIX PM620. The cameras were remotely controlled by the pilot, the downwards-looking installation in the Mk.XIX proving to be highly successful



LEFT: Not all recon Spitfires were unarmed. Seen at RAF St Eval in Cornwall, pink-painted PR.Ig R7059 carried the usual Spitfire Mk.I armament of eight .303in machine guns in the wings, with its cameras mounted in the fuselage. This mark was later redesignated as PR.VII
MALCOLM V
LOWE COLLECTION



Spitfire PR Mk.Ia N3071 performed the RAF's first operational photo-recce sortie on November 18, 1939, with Maurice Longbottom at the controls ANDY HAY-FLYING ART

Extended wing tips were a feature of 2 PRU Spitfire PR.Id Trop BR146, which was based at Marble Arch, North Africa, in 1942. It wore blue over white camouflage and was fitted with an Aboukir filter ANDY HAY-FLYING ART

In October 1939, Fighter Command reluctantly released two of its precious Spitfire Mk.I fighters, N3069 and N3071, and these became the very first recce-configured Spitfires. Moved to Heston airfield, where they went under the cover name of the Heston Flight, they were placed in the charge of a team of specialists who converted them for recce work. Their airframes were specially painted and polished, with most unopening panel joins filled and all the armament and radio equipment removed.

A breed apart

Eventually known as Spitfire Mk.I PR Type A or PR.Ia, they were fitted with a downward-looking F.24 camera with a 5in focal length lens in each wing, where the two inboard machine guns and their ammunition boxes normally fitted.

This was a tight squeeze. It has been stated that these aircraft could fly at 390mph, but that depended on weather and sortie profile.

The first-ever Spitfire recce flight was performed by Maurice Longbottom, piloting N3071 from Lille-Seclin in France, on November 18, 1939. The outstanding success of this and further flights from French airfields, ostensibly for survey work, proved the validity of the concept as proposed by Longbottom and Cotton.

From then, the recce Spitfire became an important asset. In the following months, an increasingly large number of camera-carrying Spitfires followed, some being ad hoc conversions, while others were created on the production line when actual manufacturing of recce Spitfires was started by Supermarine. The accompanying diagrams illustrate the significant

differences of the main marks of recce-configured Spitfires.

Many conversions

Following the PR.Ia was the Mk.I PR Type B or PR.Ib, which carried its cameras in the fuselage behind the cockpit to resolve concerns over centre of gravity issues. This new recce variant had a radius of action of just over 300 miles, due to the installation of an additional 29 gal fuel tank behind the pilot.

Although this increased range was a major step forward, the next conversion, the Mk.I PR Type C or PR.Ic, took the matter further. It featured

BELOW: Reinforcing strips on the upper wing surface are evident in this view of a production Spitfire PR.Mk.IV. Originally the Mk.I PR Type D or PR.Id, this version featured extended range and was a valuable addition to the growing selection of recce sub-types



a 'blister' with an external 30 gal fuel tank attached beneath the port wing balanced by a flattened fairing below the starboard wing carrying two F.24 cameras with 8in focal length lenses. Retaining the additional fuel tank behind the pilot of the PR.Ib, this Spitfire's range was sufficiently increased to allow a sortie to Kiel on the coast of the Baltic Sea and back to be flown on April 7, 1940.

Covert adaptations

Much of the conversion work and prototype flying at Heston was executed under strict security. Cotton was made an acting wing commander and his activities later went under the cover name of 2 Camouflage Unit. Eventually this pioneering work was formally renamed as the Photographic Development Unit (PDU) at RAF Heston, and later at RAF Benson, which was eventually to become a major hub of RAF recce activities. The unit later gave birth to 1 Photographic Reconnaissance Unit (PRU), the first of several such specialist organisations within the RAF at home and overseas.

The early successes of the recce sorties flown from French airfields led to the establishment of an RAF unit, 212 Squadron, which mounted operations from Lille-Seclin until



ABOVE: The PR.X was externally similar to the Mk.XI, but had a pressurised cockpit as shown by the cabin air intake below the exhaust and heavier canopy slide rails. The type entered service in the spring of 1944

forced to withdraw due to the German advances following the invasion of France on May 10, 1940.

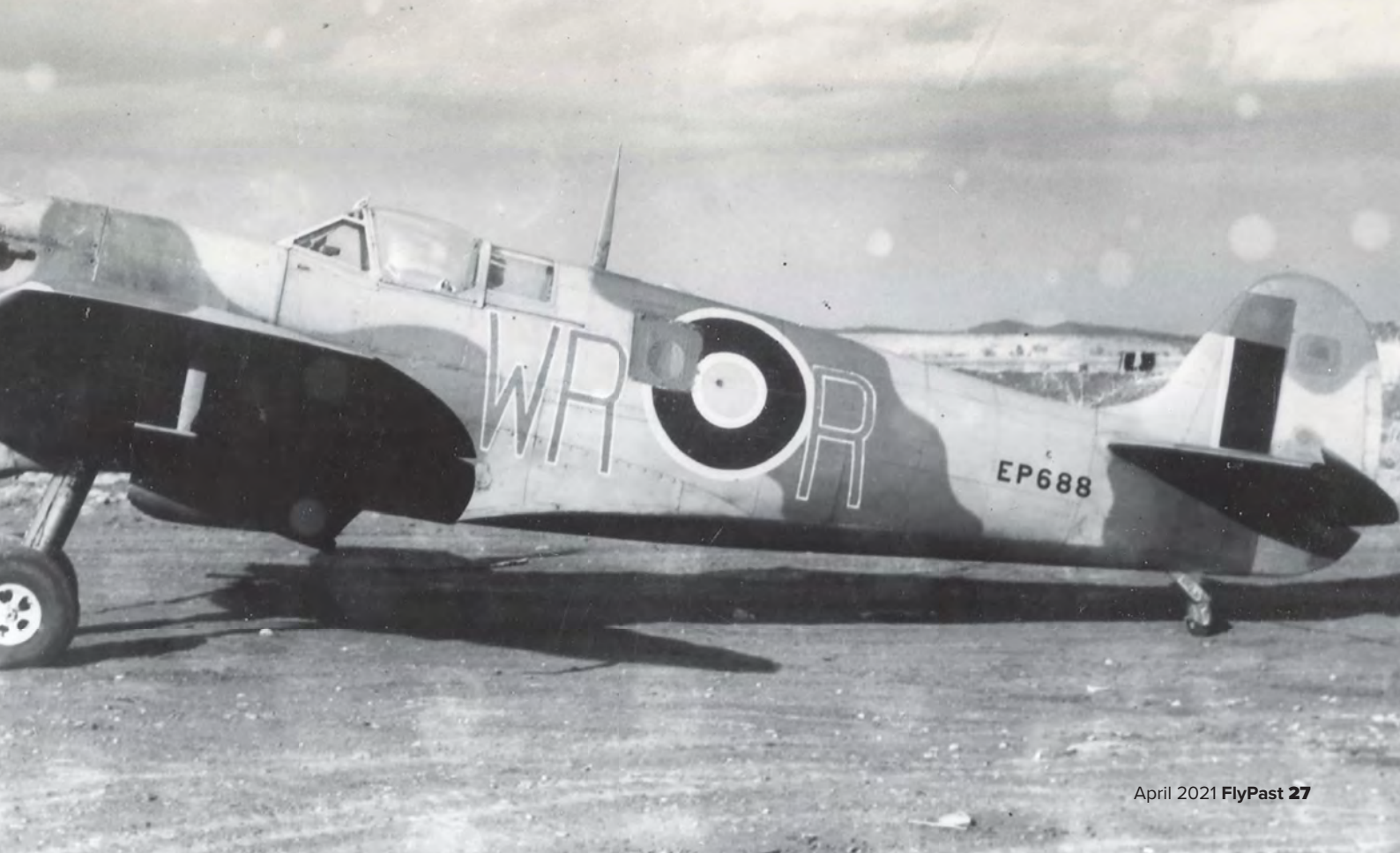
By then, work was underway to create a recce Spitfire with even greater range, leading to the Mk.I PR Type D or PR.Id, which was the first to utilise some of the internal space within the wing structure to house more fuel. Initially, two airframes were adapted to pioneer this concept, P9551 and P9552, but work progressed slowly on this more challenging task. When it finally came to fruition, this was the first recce Spitfire to be made on the production line rather than relying solely on 'hand-made' conversions, with the type later redesignated as the PR.Mk.IV. Altogether 229 were built, and they included an additional feature that was appreciated by its pilots: a

rudimentary but effective cockpit heating system. The type carried its camera equipment in the fuselage behind the cockpit.

The first sorties with a PR.Id were made during October 1940, one of these flying as far as Stettin near the German Baltic coast. When they finally became available, the PR.IV production airframes were the basis of much of the RAF's recce work until well into 1942.

Just one Mk.I PR Type E or PR.Ie, N3117, is known to have existed. This airframe was optimised for low-level photography and had an F.24 camera in a fairing beneath each wing for oblique photography, each one pointing outwards at a right angle to the line of flight and pointed downwards. This was the first Spitfire with cameras mounted obliquely rather than vertically.

BELOW: Some ad hoc conversions of Spitfire Mk.Vb airframes turned them into camera-carrying recce aircraft. One such was LF.Vb EP688/WR-R of 40 Squadron, South African Air Force in the Mediterranean theatre



LEFT: The only known Spitfire Mk.I PR Type E or PR.Ie was N3117. It featured a single oblique camera under each wing, pointing outwards and slightly downwards. Note the rounded windscreen

The Mk.I PR Type F (PR.If) was an interim long-range conversion that entered service in July 1940, ahead of the delayed Type D. This had a 30 gal blister fuel tank beneath each wing and again carried its vertical cameras behind the cockpit, but what was notable with this model was an oblique camera positioned looking out to port and fitted just aft of the cockpit. This particular mounting proved highly successful and was replicated on later recce Spitfires and other aircraft, notably the North American Mustang.

The Mk I PR Type G (PR.Ig) was the first armed fighter-reconnaissance conversion, and was intended for a similar low-level tactical role as the PR.Ie. An oblique F.24 camera with either an 8in or 14in focal length lens was fitted just aft of the cockpit, while two vertical F.24 cameras were installed in the fuselage. This type retained the eight .303in machine gun armament and gunsight of the standard Spitfire Mk.I, as well as the fighter-style windscreen rather than the curved frameless windscreen pioneered on some earlier recce versions. Several similar conversions were later made from Mk.V rather than Mk.I airframes, and this type was subsequently re-designated as the Spitfire PR.VII. The Spitfire Mk.V airframe was also used as the basis for PR conversion work by South African technicians.

An improvement on the earlier PR.Ig and with the same camera fit, the PR.Mk.XIII was powered by the Merlin 32 engine, which was



MIDDLE: The F.24 oblique camera installation in the fuselage of a Spitfire PR.XIX. Positioning and removing cameras was not always easy due to a lack of room, with larger cameras also heavy to carry

specifically rated for low-altitude flight. At least some examples carried a light armament of four .303in Browning machine guns in the wings. The first prototype PR.XIII was tested in March 1943, with 26 duly being converted from either PR.Ig, Spitfire Mk.II or Mk.V airframes. They were used for low-level tactical recce work, including much action before and during the D-Day period in 1944.

A distinctive feature of most recce Spitfires was the special 'blown' cockpit canopy, some of which incorporated large lateral teardrop-shaped blisters. This 'clear-view' arrangement gave pilots excellent vision towards the rear and below, which was important for sighting the cameras accurately. These were 'aimed' by aligning a tiny '+' marked on the port side of the canopy with



a black sighting line positioned on the port aileron.

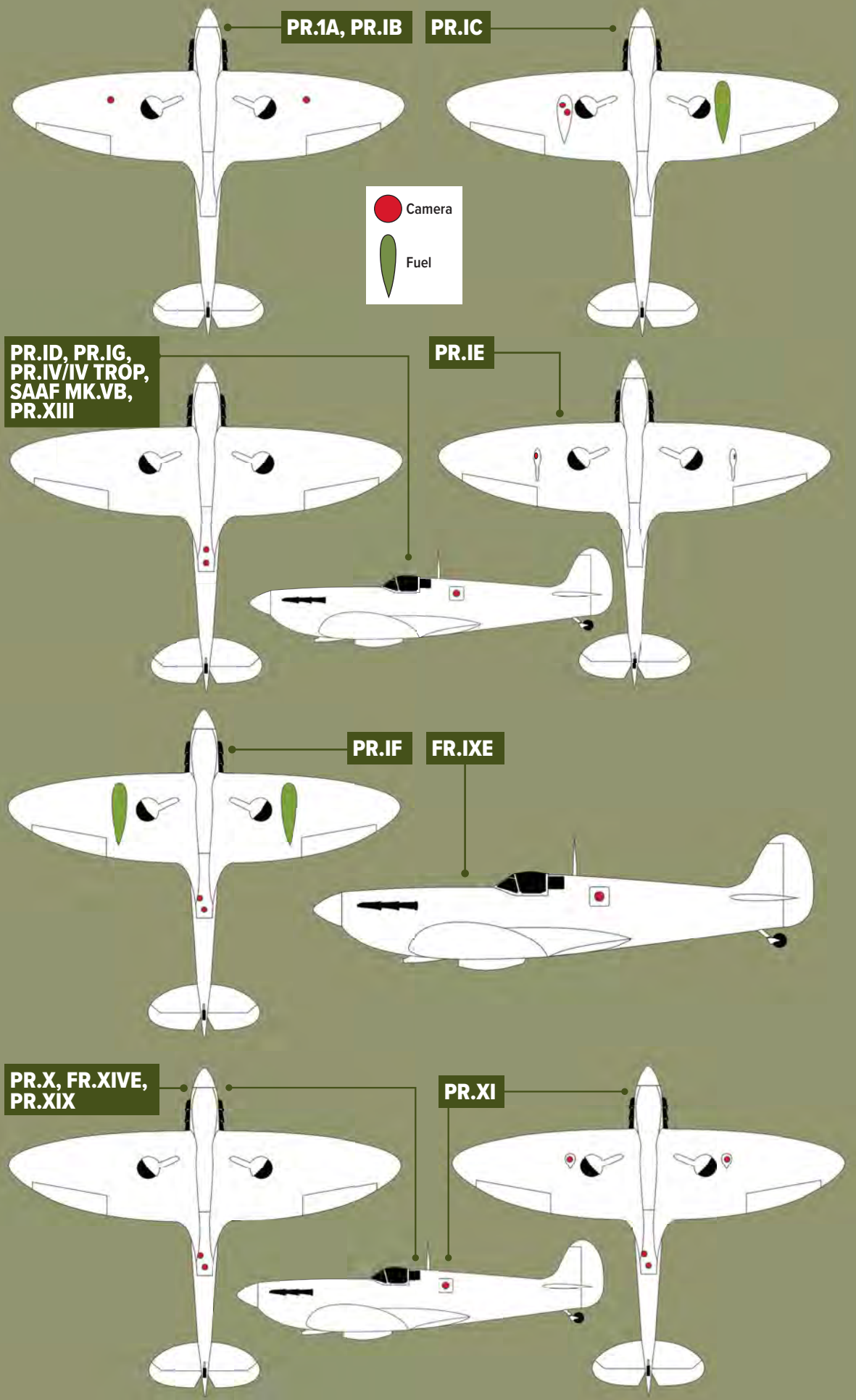
Major advances

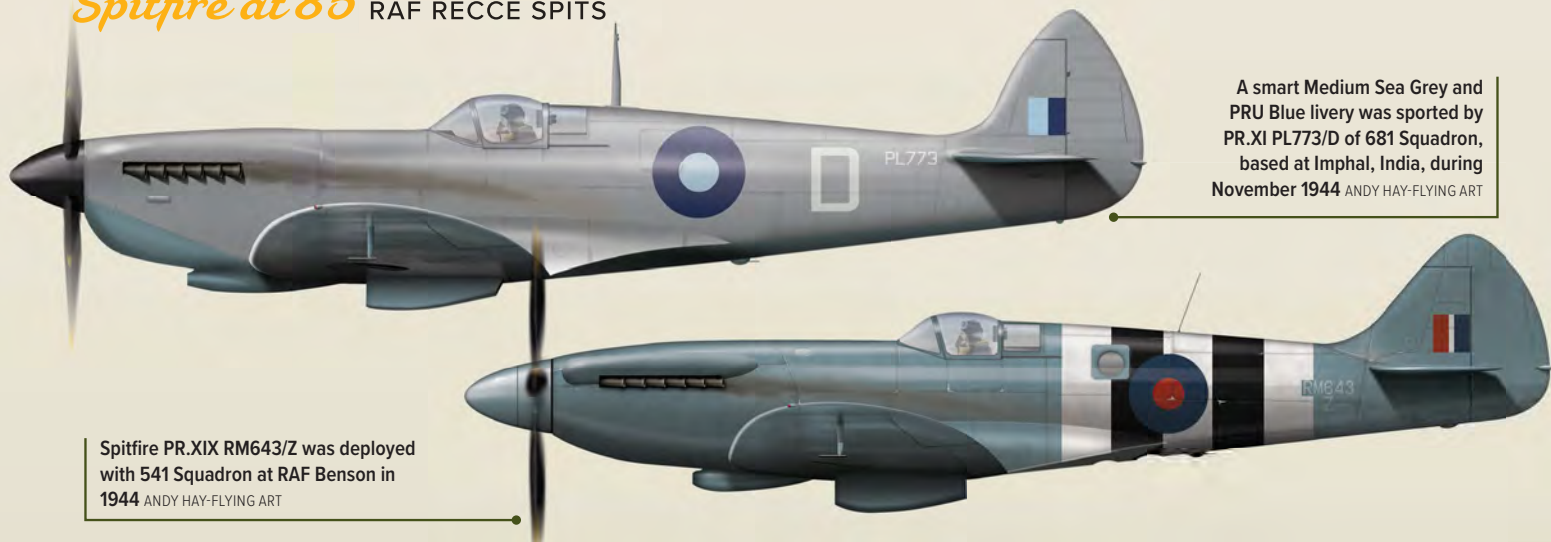
The second phase of Spitfire recce development was far more formalised than the somewhat ad

BELOW: Painted in special 'Camotint', probably light green, Spitfire PR.Ia N3071 is pictured at Lille-Seclin in France on November 18, 1939. Piloted by Maurice Longbottom, it was making the first-ever RAF Spitfire recce sortie JB VIA MALCOLM V LOWE



POSSIBLE CAMERA POSITIONS IN RAF RECCE SPITFIRES OF WORLD WAR TWO





A smart Medium Sea Grey and PRU Blue livery was sported by PR.XI PL773/D of 681 Squadron, based at Imphal, India, during November 1944 ANDY HAY-FLYING ART

Spitfire PR.XIX RM643/Z was deployed with 541 Squadron at RAF Benson in 1944 ANDY HAY-FLYING ART

BOTTOM RIGHT: Displaying its two lower fuselage camera ports for vertical cameras aft of the cockpit and wing roots, this PR.XI wore full 'Invasion Stripes'. Note the prominent 'chin' of this version MALCOLM V LOWE COLLECTION

BELOW: Recce Spitfires operated in many war zones. This PR.XI, PA846/F, was photographed in Bengal, India, between PR sorties over Japanese positions

hoc and 'hand-made' conversions of the first models. It centred around advances in Rolls-Royce Merlin development and was based on lessons learned early in the RAF's recce Spitfire operations.

The advent of the more powerful two-stage Merlin 61-series allowed better fighter versions of the Spitfire to be built, leading to the excellent and numerous Mk.IX day-fighter. This became operational during 1942 and, such as the urgency of creating recce versions based on this model, 15 standard Mk.IX fighters were converted to interim recce types. This was the PR.IX, with two vertical cameras in the fuselage behind the cockpit. These were painted PRU Blue and at least some served with 541 Squadron at Benson.

An armed FR.IX was also built, similar to the PR.IX, and some examples were painted pale pink, one of several odd colour schemes trialled on recce Spitfires to find a camouflage suitable for their mission. These were active on the

Continent following D-Day and made high-profile recce sorties during the failed operations to capture the Dutch town of Arnhem.

Two major production models were also built based on the Mk.IX and the Merlin 61-series engine: the pressurised Mk.X and unpressurised Mk.XI.

The first PR.XI examples were completed during November 1942, and these gradually replaced the PR.IV in service. The PR.XI carried two vertical cameras in the fuselage behind the cockpit and an oblique F.24 just aft of the cockpit. This type was distinctive for its pronounced 'chin' due to an enlarged oil tank in the lower forward fuselage, as pioneered on some initial recce Mk.I conversions.

The Mk.X was a pressurised production model, externally similar to the PR.XI except for a cabin air intake below the exhaust on the forward fuselage and heavier canopy slide rails.

According to manufacturer's statistics, 471 PR.XIs were built

or converted from airframes intended to be finished as Mk.IX day-fighters, with production continuing into 1944. This fast, unarmed, high-altitude camera platform was well-liked by its pilots, and the type served the RAF (and other air forces) very well, not just in northwest Europe but elsewhere in the world.

Only 16 PR.Xs are confirmed to have been built by Supermarine, which is surprising considering their exceptional high-altitude performance. They were operational from May 1944, principally with 541 Squadron.

Griffon finale

The third and final generation of Spitfire recce development centred on arguably the best and most capable camera-carrying Spitfire mark, the PR.Mk.XIX. This excellent recce platform was also very dissimilar from its PR Spitfire predecessors, in being powered by a different engine type altogether: the Rolls-Royce Griffon.



The performance of this unarmed recon Spitfire was exceptional. It could easily reach altitudes of 40,000ft on operations, maintaining a steady 370mph even at that height. Indeed, some examples are known to have flown even higher, allowing them the comfort of being virtually immune from interception even by the Luftwaffe's much vaunted Me 262 jet fighter.

With an internal fuel volume of 256 gal – the highest of all the recon Spitfires – the Mk.XIX also had the longest endurance and range. It truly marked the pinnacle of Spitfire development. Factory-built, initial examples were delivered in May 1944 to 542 Squadron. The first 25 airframes were unpressurised, with the standard entrance door in the port fuselage side for the pilot. After that, all airframes were pressurised, with the relevant equipment based on that of the PR.X. The camera fit was similar to that of the PR.XI.

A total of 225 were built, with production ceasing during early 1946. The type served with units until the end of World War Two, gradually replacing the PR.XI. They continued in service for many years after, the final examples being retired in 1957 as the last operational Spitfires in the RAF.

Besides the dedicated recon PR.XIX, the day-fighter Spitfire Mk.XIV was also a camera-carrying,

Griffon-powered workhorse. Provision was made by conversion of some standard fighter Mk.XIVs with the 'E' wing to carry an oblique camera just behind the cockpit, which could face to port or starboard, on examples with and without the cut-down spine behind the cockpit. A major user of these armed low-to-medium altitude fighter-recon platforms was 2 Squadron (II(AC) Squadron). **FP**

BELOW: Merlin 45-powered Spitfire PR.Mk.VII X4786 (originally a Mk.I) displaying the special cockpit canopy design that characterised recon Spitfires, several variations being trialled. The small cross on the canopy was for sighting the on-board cameras

